Chemical Mechanical Polishing and Electrochemical Characterization of Tungsten by Using Mixed Oxidizers

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Chemical-mechanical polishing(CMP) of tungsten has emerged as an important technology in integrated circuit fabrication. Tungsten is known as a suitable material for CMP process, because tungsten is harder than other metals such as Al and Cu but its oxide is softer than other metal oxides. Combination of two or more oxidizer is used to oxidize tungsten since it shows better polishing performance than single use. The effects of mixed oxidizers on tungsten-chemical mechanical polishing processes were studied by using combination of hydrogen peroxide and second oxidizing agent. Some kinds of metal salts were selected as a second oxidizing agent and then their effects on electrochemical properties were tested statically and dynamically by using potentiostat with rotating disk electrode(RDE). Then polishing properties were obtained from actual CMP process and it was correlated with the electrochemical properties. Lastly, slurry compositions with higher tungsten removal rate and slurry compositions which can be used near the pattern were developed.